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UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF PUBLIC ROADS AND RURAL ENGINEERING

Washington, D. C.

FIELD LETTER NO. 36.

May 1918

Logan Waller Page, Director

P. St.J. Wilson, Chief Engineer; J. E. Pennybacker, Chief of Management; Samuel Fortier, Chief of Irrigation Investigations; S. H. McCrory, Chief of Drainage Investigations; E. B. McCormick, Chief of Rural Engineering; Prevost Hubbard, Chief of Tests.

CONSTRUCTION AND MAINTENANCE

Special Inspection and Advice.

Mr. Vernon M. Peirce, Assistant Engineer, in company with Mr. Prevost Hubbard, Chief Div. of Road Material Tests & Research, left Washington May 20th for points in Pennsylvania, New Jersey, New York and Connecticut to inspect National and Willite pavements. They returned to the Office May 27th.

Mr. E. W. James, General Inspector, was with the Florida State Highway Department from May 24 to 31st, inclusive, on plans and specifications for that State.

Mr. B. H. Burrell, S. H. E., who has been in charge of road construction work at Camp Funston, Kansas, returned to the 6th District Office on May 31st.

W. F. Brooks, S. H. E., who has been assisting the Kentucky State Highway Commission, has been called to the Seventh District Office to assist Mr. Voshell on Federal Aid work, and he reported at that office on May 6th.

On May 27 Mr. MacNab, S. H. E., who has been working for the 10th District Engineer, was assigned to assist the Virginia State Highway Department.

W. L. Spoon, S. H. E., who was assigned to make inspections in Virginia, has been assigned to advise in regard to the construction of about 3 miles of slag road in Ann Arundel County, Maryland. He reported at this Office between assignments on May 29th.

Mr. Purcell, Senior Highway Bridge Engineer, who has been with the 1st District Office in Oregon, left there May 13th enroute to Washington to confer with Mr. O. L. Grover, Bridge Engineer, in regard to plans, specifications, etc.

V. E. Towles, H. E., who has been working in Florida with Management Division, went on leave May 20th until June 10th.

Considerable repairs have been made during the month on Rockville Pike and Mount Vernon Avenue Roads, and one of our patrolmen with additional labor has done surface repairing on the Agricultural Grounds. Owing to the lack of materials, bids for which have been asked and no bids received, the experimental sections in the vicinity of Washington are not in first class repair, but every effort is being made to secure the necessary materials in open market in order that proper repairs can be made at once.

F. A. Davis, J. H. E., is still engaged in supervising construction work in Albemarle County, Virginia.

Messrs. Alderman, H. E., Crossland, S. H. E., and Marshall, S. H. E. are still engaged on cantonment work at Fort Sam Houston, Texas,;Atlanta, Georgia, and American Lake, Washington, respectively.

J. J. Tobin, E. E., and C. F. Lewis, Inst. Man, are engaged in constructing roads at the cantonment at Edgewood, Maryland.

TESTS AND RESEARCH

Administration

Since the last issue of the News Letter, the following changes in personnel in this division have taken place:

H. F. Fairbanks has accepted a First Lieutenancy in the Ordnance corps and is stationed at Magnolia, Md.

J. T. Pauls is on furlough attending the Reserve Officers' Training Camp at Camp Taylor, Kentucky.

D. O. Woolf has enlisted in the Aviation corps and is now taking his ground school at Princeton, N. J.

R. H. Lewis is on furlough attending the Reserve Officers' Training Camp at Camp Meade, Maryland.

B. A. Anderton is transferred to the United States Shipping Board and is engaged on research work in conjunction with concrete ship construction.

A. T. Goldbeck is cooperating with the Shipping Board on research work on concrete ship construction.

C. S. Reeve has accepted a position in the research department of the Barrett Company in New York, and will leave the Office sometime in June.

W. E. Rosengarten, Eng. Econ., has been assigned to the Physical Testing Laboratory.

H. M. Milburn has been appointed Assistant Chemist.

R. H. Parker has been appointed Laboratory Assistant in the Chemical Laboratory.

Mr. Hubbard in company with Mr. Peirce took a trip during May for the purpose of inspecting National and Willite pavements.

THE HISTORY OF THE
CITY OF BOSTON
FROM THE FIRST SETTLEMENT
TO THE PRESENT TIME
BY
JOHN HUTCHINGS
OF THE BARRISTER AT LAW
IN THE SUPREME COURT OF JUDICATURE
IN NEW ENGLAND
AND
OF THE BARRISTER AT LAW
IN THE SUPREME COURT OF JUDICATURE
IN GREAT BRITAIN
AND
OF THE BARRISTER AT LAW
IN THE SUPREME COURT OF JUDICATURE
IN IRELAND
IN TWO VOLUMES
THE FIRST VOLUME
CONTAINING THE HISTORY
FROM THE FIRST SETTLEMENT
TO THE YEAR 1700
LONDON
PRINTED BY J. DODD, ST. MARTIN'S LANE
1764

Routine Tests and Analyses

During May 39 samples were examined in the Chemical Laboratory, 25 of which were bituminous materials. 46 samples of rock, sand and gravel were examined in the Physical Laboratory, and 56 samples were examined and classified in the Microscopic Laboratory.

Research upon the properties of dust preventatives and road binders

Owing to changes and loss in the laboratory force and also to the large volume of work necessitated by the review and tabulation of Federal Aid Specifications the Chemical laboratory investigations have been practically discontinued for the present.

Ultra microscopic investigations of colloidal solutions were continued during the month and it was found that by heating oil asphalts containing basic copper carbonate and cupric sulphate above 200° C mixtures were obtained that showed an extremely high colloidal content of cupric oxide.

Non-Bituminous Road Material Investigations

During the past month the Physical Testing Laboratory has made investigations on the rendering of concrete proof against the percolation of turpentine. Various sorts of coatings have been applied to the concrete surface and these coatings have been put under pressure. One of them is apparently successful.

Investigations have likewise been made on various automobile oils mixed with concrete for the purpose of damp-proofing it. Of the oils tested none has been found to decrease the strength of mortar briquettes, and all were effective in decreasing the absorption of water by the concrete.

1. The first part of the paper discusses the importance of maintaining accurate records of all transactions.

2. The second part of the paper discusses the importance of maintaining accurate records of all transactions.

3. The third part of the paper discusses the importance of maintaining accurate records of all transactions.

4. The fourth part of the paper discusses the importance of maintaining accurate records of all transactions.

5. The fifth part of the paper discusses the importance of maintaining accurate records of all transactions.

Investigations are now under way on the modified Deval abrasion cylinders and results of these tests will be presented in a written discussion before the coming meeting of the American Society for Testing Materials. The field work carried out last year in connection with the survey of crushed stone plants for the purpose of collecting data relative to the standardization of sizes of crushed stone is being continued this year in the middle western states. Mr. C. W. Mitman is now in the field and will cover the state of Ohio during this month, Dr. Ladd is collecting cost data on quarrying in New England.

Soil Pressure Investigations

At the Arlington Laboratory pressure tests on hydraulic fills are almost completed and the pressure cells which have now been in operation for practically 11 months are still working very satisfactorily and have demonstrated their practicability under working conditions.

Concrete Investigations

Tests are being made in conjunction with the Shipping Board as follows:

1. Pouring Tests to determine how best to pour concrete in very thin wall construction in which there is a large percentage of reinforcing metal. The method which was very successful was that of rapidly vibrating the forms while the concrete was being poured. This causes the concrete to flow down through very thin openings and around the reinforced steel and makes a very smooth surface.

2. Bond Tests. These tests are being continued on plain and deformed bars coated with various kinds of bituminous and other paint coatings, as well as various metal coatings. It was found that all paint coatings decreased the bond strength materially.

3. Beam Tests. The last of a series of 14 beams has been tested with the idea of determining the safe unit shear to use in concrete vessel design.

4. Pressure of Concrete Against Forms. Tests were made by the use of the soil pressure apparatus on the pressure of concrete against a reinforced concrete bulkhead specimen poured at the Bureau of Standards. It was found that after 45

minutes of continuous pouring the pressure of the concrete began to decrease notwithstanding the continued increase in the head of concrete. Preparations have now been made for continuing these tests on a more elaborate scale and this will be started in one or two days.

5. Bonding of New Concrete to Old: An investigation is now underway for determining the best method of bonding new concrete with concrete already set and these tests will include strength tests and tests for permeability.

Compression Tests have just been completed on specimens of concrete which have been stored in a silo for three years with the idea of determining the effect of the end silage on the strength of the concrete.

The apparatus recently made by this Office for the Frankford Arsenal to be used for testing primers was installed and calibrated a few weeks ago, and very successfully recorded the speed and the intensity of the explosive force of fulminate of mercury.

I R R I G A T I O N

Administration

V. M. Cone, Irrigation Engineer, has resigned his position with this Office for the purpose of engaging in private engineering work at Tulsa, Oklahoma.

H. C. Diesem, Irrigation Engineer, has received a commission as captain in the Engineer Officers Reserve Corps of the Army and is now stationed at Camp Lee, Virginia.

W. W. McLaughlin, Irrigation Engineer, has been granted a furlough without pay until some time next fall, in order to continue the investigation of water rights on Bear River in Utah and Idaho, which he began last fall.

During the month of April the transfer of the division to Berkeley, California was effected. The members of the force transferred were: Dr. Samuel Fortier, Chief; R. P. Teele, Irrigation Economist; A. T. Mitchelson, Irrigation Engineer, and P. A. Ewing, Assistant Irrigation Economist. They now occupy rooms in the Federal building, Berkeley, adjacent to the offices of the California field force. The affairs of the division in Washington will be looked after by Guy Ervin, Clerk.

Utilization of Water

J. C. Marr, Irrigation Engineer, has about completed a brief investigation and report on the irrigation of cotton in Arizona.

C. E. Tait, Senior Irrigation Engineer, has completed a report on irrigation possibilities in Victor Valley, California, which will be published by the State Engineer.

H. C. Diesem, Irrigation Engineer, before leaving the service submitted a manuscript for a publication on "Subirrigation in a Portion of the Great Plains Area".

A new experiment station for the study of the duty of water in Texas has been established by W. L. Rockwell, Irrigation Manager, at Plainview, Texas. This is the third station now in operation under Mr. Rockwell's supervision in Texas, the others being located at Mercedes and Crystal City. The work is carried on under cooperation between this Office and the Board of Water Engineers of Texas.

Pumping for Irrigation

L. M. Winsor, Agent, has begun investigation of the feasibility of pumping water for irrigation in various parts of the state of Utah. In many localities in the state the only source of water for irrigation is the underground supply which often lies at comparatively shallow depths. In cooperation with the state, wells will be put down in various typical localities, pumps installed and demonstrations made of the possibilities of developing the underground water resources

C. G. Haskell, Irrigation Engineer, is continuing his study of wells begun a year or more ago. He has covered several important valleys in Texas this spring in this study and will visit some of the other western states during the course of the summer.

Flow of Water

F. C. Scobey, Senior Irrigation Engineer, intends to devote the greater part of the coming field season to a study of the flow of water in flumes. His report on the flow of water in concrete pipes is about completed.

A. T. Mitchelson, Irrigation Engineer, has completed his report on spillways and during the coming summer will complete the field investigation on chutes and drops begun several years ago by J. T. Kingdon.

Drainage of Irrigated Lands

Great interest continues to be shown in drainage in the Western states, particularly in New Mexico, Colorado, Utah, Wyoming and the Northwest. A large part of the time of R. A. Hart, Senior Drainage Engineer, O. V. Adams, Drainage Engineer, M. R. Lewis, Irrigation Engineer, D. W. Bloodgood, Agent and L. T. Jessup, Junior Drainage Engineer, has been devoted to this work. R. L. Parshall, Irrigation Engineer, and F. L. Bixby, Irrigation Engineer, have also devoted some time to drainage matters.

DRAINAGE INVESTIGATIONS

Administration

Since April 15 Charles Kirschner, D. E., and Joseph L. Chambers, J. D. E., have taken indefinite leave to enter the Army; Mr. Chambers is in training at Camp Meade, Mr. Kirschner was to report May 30th. Kay B. Knudson, J. D. E., has resigned to enter private employ.

Bunkett S. Clayton of Missouri has been appointed Drainage Engineer and reported for duty in March.

Messrs. McCrory and Marsden assisted in a conference at the Bureau of the Census, with engineers from private practice, in preparing a special drainage questionnaire recommended for use in the 1920 census.

Construction, Operation and Maintenance

A cooperative agreement has been entered into with the Geological and Biological Survey of Michigan for an investigation of the status of drainage, with costs for construction and maintenance, including a study of the operation of the drainage law. Messrs. Miller, Shafer and Simons are at work upon that investigation, studying the county records in detail and securing supplementary information by interviews with county officials. The report should be ready about October 1.

Since the last issue of the field letter construction prices have been reported as follows:

Clay tile, f.o. b.

Size	Scottsboro, Ala. (February)	Hurtsboro, Ala. (February)	Texarkana. (March)
4-inch	\$ 24.35	\$ 20.30	\$ 36.00
5- "	34.00	25.60	45.00
6 "	42.65	32.40	60.00
7 "	51.65	43.60	-- --
8 "	70.65	54.80	112.00
10 "	108.30	85.00	154.00
12 "	143.95	113.20	196.00
15 "	--- --	--- --	300.00
18 "	--- --	--- --	400.00

	Columbia, S. C. (March)	Ivor, Va. (February)	Wilmington, N. C. (February)	Newbern & Kinston, N. C. (February)
4-inch	\$ 24.00	\$ 31.70	\$ 34.50	\$ 37.50
5 "	36.00	38.40	48.00	51.50
6 "	-- --	46.00	66.00	70.50

No. 2 sewer pipe (per foot)

Anywhere in North Carolina (from Chattanooga).

8-inch	10 ¢	12-inch	25.5¢	18-inch	51 ¢
10 "	19.5 ¢	15 "	37.5¢	20 "	67.5¢

	Eureka W. Va. (January)	Parkersburg W. Va. (January)	Meadowdale W. Va. (April)	Keyser, W. Va. (February)	Glazed
4-inch	\$ 30.45	\$31.50	\$ 35.00	\$ 36.40 - 29.75	31.50
5 "	40.95	42.50	46.75	46.30 - 42.50	45.00
6 "	54.08	56.75	67.00	61.20 - 55.25	58.50
8 "	88.20	-- --	103.00	108.25 - 90.00	95.00

Trenching, laying, and blinding.

Columbia, S. C.	4 cents per linear foot (by contract).
Parkersburg, W. Va.	3 " " " " (by day labor); clay subsoil.
Old Town, Md.	3 " " " " (by day labor); for trenching

only; and as much more for digging trenches again after bad weather, tile not having been laid. Clay subsoil.

Reports Transmitted:

Conditions in Tuscumbia River Ditches, Mississippi, by
Guy A. Hart.

Results of improving Gills Creek, Abbeyville, South Carolina, by
F. G. Eason.

Reports Received:

Ditching plows for tile drainage, by Fred F. Shafer.

Proposed maintenance work for Broad Creek District, Beaufort
County, North Carolina, By H. M. Lynde.

Map showing drainage districts in Louisiana, compiled by
Charles Kirschner.

Peat, Turf, and Muck

The studies of subsidence of drained muck soils in Florida and Louisiana by F. E. Staebner and Charles Kirschner have been brought up to date by platting the profiles to show the subsidence during 1917.

Organizing and Financing Drainage Districts

In the last few months a new line of work relative to financing drainage districts has developed. The Capital Issues Committee refers here for investigation requests from drainage districts for approval of proposed bond issues. Such investigations require studies not only of the ultimate practicability of the reclamation work proposed, but also of the time required for securing the benefits, involving a consideration of the labor for construction and for further improvement work such as clearing the drained land. Fourteen such investigations have been made for the Capital Issues Committee, and several others are pending.

Runoff

A few gaugings were made of the Saginaw River, Michigan, during high water. The compilation of runoff data and the computation of values for Kutter's roughness coefficient have been continued.

Irrigation in Humid States

Plans for sewage irrigation plants for the Borough of Vineland New Jersey, the State Home for Women at Vineland, New Jersey, and for the Lincoln University, Pennsylvania, have been transmitted.

Arrangements have been made for testing under field conditions the automatic spray nozzle and the automatic sewage irrigation valve designed by F. W. Stanley, S. I. E. These experiments are to be made at Vineland, New Jersey.

A cooperative agreement has been entered into with the Agricultural Experiment Station at Gainesville, Florida, for installing a sewage irrigation plant and observing the effect of such irrigation upon a typical field of sandy soil at that station.

Arrangements have been made with the Pomological Division of the Bureau of Plant Industry for a cooperative study of irrigation and drainage for certain pecan orchards in Florida and Georgia.

Memorandum relative to the plans of the Louisiana Canal Company, southwest Louisiana, has been prepared by F. W. Stanley and transmitted to that company.

After completing a number of examinations in Florida, F. W. Stanley has visited Louisiana, Texas, New Mexico, and California for the study of irrigation conditions and methods applicable to humid conditions.

Plans for four farm irrigation plants in the southeastern states have been transmitted.

Reports Received.

Results of irrigation at Meenah, Wisconsin, by Louis Hertziger Jr.

Small irrigation in the middle Atlantic states, by Geo. A. Mitchell.

Conditions in the rice territory of southwest Louisiana and Texas, by Charles Kirschner.

Tillable Lands

Manuscript on terracing farm lands by Charles E. Ramser, has been submitted for publication as a Farmers' Bulletin.

Reports Transmitted.

Since the record in the last issue of the monthly field letter plans for tile drainage and terraces have been prepared and submitted to seventy-nine farm owners.

Reports Received.

- Vertical drains in the Upper Mississippi Valley, by Fred F. Shafer,
Effect of tile drains upon ground water, McCracken County, Kentucky,
by Fred F. Shafer.
Farm drainage in Mississippi, by Guy A. Hart.

Overflowed Lands.

- J. V. Phillips and B. S. Clayton are making a survey of the Kettle
Creeks Drainage District, Washington, Co., Ga.

Reports Transmitted.

- U. S. Explosives Plant C, Putnam and Kanawaha Counties, Virginia,
by D. L. Yarnell.
Clear Boggy River, Oklahoma, (supplementary report).
Marydel Drainage District, Carolina County, Maryland (viewer's re-
port), by Fred F. Shafer.
Ottawa Lake Outlet Drain, Monroe County, Michigan, by
D. G. Miller.
Monana-Harrison Drainage District Extension, Iowa, by
D. L. Yarnell.
G. W. Hollinshead, Jr. Levee, Baldwin County, Georgia, by
J. V. Phillips.
Upper Great Egg Harbor River, Camden County, New Jersey (preliminary
report), by W. N. Hall.
Buckshutem Meadow, Cumberland County, New Jersey (preliminary
report), by W. N. Hall.
Beaver Ruin Creek, Gwinnett County, Georgia (preliminary report),
by J. V. Phillips.
Walnut Creek District, Merriwether County, Georgia (preliminary
report), by J. V. Phillips.
White Oak Creek District, Coweta County, Georgia (preliminary report)
by J. V. Phillips.

Big and Little Kettle Creeks District, Washington County, Georgia
(preliminary report), by J. W. Phillips.

Haw Creek District, Bartholomew County, Indiana, (preliminary report
by D. L. Yarnell.

Investigations have been made of the proposed improvements for
Goose Creek and Mill Creek Drain, Washtenaw County, Michigan, by P. T.
Simons; of the Reservoir Improvement Company, Vigo and Clay Counties
Indiana, and of Patoka River District, Pike and Glenn Counties, Indiana,
by D. L. Yarnell. Reports of these examinations have been filed.

Reports Received.

Meadow River Drainage District, Greenbrier County, West Virginia,
by Fred F. Shafer.

Swamp Lands

Report Transmitted.

Culbreth Marsh Ditches, Kent County, Delaware, (preliminary report)
by W. N. Hall.

Report Received.

Zekiah Swamp, Charles County, Maryland, (preliminary report), by
D. L. Yarnell.

RURAL ENGINEERING
Administration.

E. B. McCormick, during the fore part of the month, attended the
convention of the National Wagon Manufacturers Association, Louisville,
Kentucky. At this meeting certain definite standards were adopted for
farm wagon manufacture.

A. D. Morehouse and Elmer Johnson made a two-week trip through
parts of the middle west and Pennsylvania to secure data for a bulletin
on the Care and Repair of Threshing Machines.

James Arentson of the Extension Division of the University of
Tennessee, spent several days in conference with members of this Office
getting material for use in his work. The Division of Rural Engineering
is cooperating in this work.

Farm Domestic Water Supply and Sewage Disposal

Some work was done on the preparation of a comprehensive sewage system for the Arlington Experimental Farm, which will provide for the sewage from the new Office of Public Roads and Rural Engineering laboratory as well as that of the buildings which may be erected in the future in accordance with the approved layout of buildings and grounds.

The usual correspondence in connection with this branch of the work was carried on.

Farm Structures

Drawings for a combined corn crib and granary were completed, as well as drawings for the first of a series of farm shop designs.

The drawings and specifications for the laboratory buildings to be erected for the Office of Public Roads and Rural Engineering on the Arlington Experimental Farm were completed and bids requested.

Sketches were prepared for one and two-room rural school houses in connection with the cooperative arrangement between this Office and the Extension Division of the University of Tennessee.

Work on the bulletin on "Farmstead Planning" is progressing.

Mechanical Problems

A Farmers' Bulletin on Threshing Machines has been practically completed, and will contain several illustrations. This will be No. 5 of the series of bulletins on the Care and Repair of Farm Implements.

A steam heating layout for the new laboratory building at Arlington was designed by A. M. Daniels.

Information Series No. 18 Revised and No. 28, entitled respectively, "Department of Agriculture Bulletins Pertaining to Agricultural Engineering" and "Fence Posts", were completed for use with correspondence.

Dust spraying apparatus in operation, was inspected by Elmer Johnson at Winchester, Virginia, the first part of May.

Problems relating to and correspondence in connection with the following subjects were handled.

Ice House Construction and Design
Hydro-Electric Plants for Farms
Stream Measurement
Farm House Heating Plans
Farm House Lighting Plans
Windmill-Electric Outfits

Farm Implements
Refrigerating Plants
Tractors
Fence Posts
Farm Machinery Patents
Farm Structures of all kinds.

